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21 December 1995

Ms. Gwen Barunas, Case Manager
New Jersey Department of Environmental Protection
Bureau of Federal Case Management
Division of Responsible Party Site Remediation
CN 028
Trenton, New Jersey 08625-0028

Work Order No.: 06720-020-002-0009

RE: LEAD IN SOILS DATA COMPILATION
L.E. CARPENTER & COMPANY
WHARTON, NEW JERSEY

Dear Ms. Barunas:

Roy F. Weston, Inc. (WESTON®), on behalf of L.E. Carpenter and Company (L.E. Carpenter), would like to respond to the New Jersey Department of Environmental Protection's (NJDEP's) request for additional information and clarification of our previous requests regarding the widespread presence and random distribution of lead in soil at the L.E. Carpenter site in Wharton, New Jersey. This letter will present a review of relevant historical site information as well as summarize the lead data collected during the Remedial Investigation (RI), supplemental RI, and remedial action field efforts. Your November 21, 1995 letter appears to be based upon information presented in the April 1995 quarterly report only and did not consider historical sampling results. Again, WESTON requests that the NJDEP consider an alternate cleanup standard for lead given the facts presented herein. In order to comply with your request for a delineation plan for Hot Spots "B" and "C", WESTON has included a proposed plan as Attachment #1 to this correspondence.

Historical Site Use

The Dover Magnetite District in one of the oldest mining districts in the country and has been intermittently active since the early part of the 18th century. Most of this activity took place prior to 1940. The Mount Hope Mine, which was the last operating mine in the district, ceased operations in the mid 1980's. Ores found in the vicinity of Wharton, New Jersey make up what is known as the Wharton ore belt. The Washington Forge Mine was located directly on what is now the L.E. Carpenter property. The West Mount Pleasant Mine was also located on what is also part of the L.E. Carpenter property, approximately 170 feet northeast of the Washington Forge Mine.

The Mount Pleasant iron ore deposit consists predominantly of the metallic mineral magnetite, which is a magnetic iron oxide (FeO). Sulfide minerals, such as pyrite, chalcopyrite and pyrrhotite, are also reported ores from the Wharton ore belt. These minerals are important sources of arsenic, copper, lead and zinc. Although abundant chemical analyses of the ore exist in the literature, all of the analyses of ores in the vicinity of L.E. Carpenter property were made prior to 1908. Due to deficiencies in the analytical technology of the time, these analyses do not include constituents of the ore, such as lead, chromium, nickel, zinc and arsenic.

All of the ore that was shipped from the district prior to 1893 was hand cobbed or hand picked, and that shipped between 1893 and 1916 was in part hand cobbed and in part concentrated on dry magnetic separators. In 1903, a magnetic concentrator was installed at the Orchard Mine, directly across the Rockaway River from the Washington Forge and West Mount Pleasant Mines (and the present location of the L.E. Carpenter property). Since this was a magnetic separation process, non-magnetic minerals, (pyrite, chalcopyrite and pyrrhotite) containing lead, chromium, nickel, zinc, and arsenic would have been enriched in the tailings.

Summary of Existing Data

Figures 1 through 5, present a summary of all the samples collected during the RI and remedial action (post excavation) phase of the project. Figure 1 shows the distribution of lead data (sample location, depth and concentration) at the site. More recently, 46 post-excavation soil samples were collected for lead analysis from hot spots B, C, D and the waste disposal area following excavation of what had been thought to be isolated elevated concentrations of lead in soils.

A total of 99 samples were collected during the RI and post excavation sampling activities and analyzed for lead. A review of the data which are summarized in Table 1 indicate that lead concentrations ranged from 2.6 mg/kg to 6,530 mg/kg, with a mean concentration of 500 mg/kg, and a standard deviation of 848 mg/kg. The data distribution indicate that these "isolated" elevated concentrations were more extensive than anticipated, suggesting that lead is not associated with the historical operational issues, but rather may be associated with the naturally occurring lead concentrations found in the fill deposited over the eastern portion of the site.

In general, areas in which lead concentrations are elevated are limited to the eastern portion of the site. A review of the 18 samples collected west of the railroad right-of-way indicate that the lead concentrations range from 2.6 mg/kg to 258 mg/kg, with a mean concentration of only 62.6 mg/kg. This fact is supportive of the hypothesis that lead found in elevated concentrations on-site is associated with the historical deposition of mine spoils which were used as fill in the

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TABLE 1

LEAD DATA SUMMARY
L.E. CARPENTER AND COMPANY

Sample Number	Lead Concentration (mg/kg)	Feet Below Grade
Test Pit Data - Remedial Investigation		
TP-1A	6.0	0.0 - 0.5
TP-1B	43.0	4.0 - 4.5
TP-2A	63.4	0.0 - 0.5
TP-2B	79.6	1.7
TP-3A	31.2	0.0 - 0.5
TP-3B	12.1	4.5 - 5.0
TP-4A	25.7	0.0 - 0.5
TP-4B	75.2	4.5 - 5.0
TP-5A	19.5	0.0 - 0.5
TP-5B	765	4.0 - 4.5
TP-6A	14.7	0.0 - 0.5
TP-6B	21.7	3.5 - 4.0
TP-7A	12.7	0.0 - 0.5
TP-7B	30.3	4.5 - 5.0
TP-8A	31.5	0.0 - 0.5
TP-8B	166	2.5 - 3.0
TP-9A	6530	0.0 - 0.5
TP-9B	338	2.0 - 2.5
TP-48	36.4	5.5 - 6.0
TP-50A	166	0.0 - 0.5
TP-50B	124	3.0 - 3.5
TP-51A	85.0	0.0 - 0.5
TP-51B	77.8	3.5 - 4.0
TP-52A	17.5	4.0 - 4.5
TP-53	39.9	2.5 - 3.0

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TABLE 1 (CONTINUED)

LEAD DATA SUMMARY
L.E. CARPENTER AND COMPANY

Sample Number	Lead Concentration (mg/kg)	Feet Below Grade
TP-54	146	2.0 - 2.5
TP-63	21.6	7.5 - 8.0
TP-64	8.7	8.5 - 9.0
TP-65	8.6	8.5 - 9.0
TP-66	2.6	7.5 - 8.0
TP-67	124	3.0 - 3.5
TP-68	36.8	7.5 - 8.0
TP-69	204	5.5 - 6.0
TP-70	97.2	7.5 - 8.0
TP-71	229	5.0 - 5.5
TP-72	203	6.0 - 6.5
TP-73	9.5	7.5 - 8.0
TP-74	154	6.5 - 7.0
TP-75	7.2	7.5 - 8.0
Hand Auger Data - Remedial Investigation		
HA-2	693	0.0 - 0.5
HA-3	215	0.0 - 0.5
HA-4	2230	0.0 - 0.5
HA-5	217	0.0 - 0.5
HA-6	276	0.0 - 0.5
HA-7	108	0.0 - 0.5
HA-8	85.5	0.0 - 0.5
HA-16	3.9	0.0 - 0.5
HA-17	10.0	0.0 - 0.5
HA-18	4.1	0.0 - 0.5
HA-19	14.4	0.0 - 0.5

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TABLE 1 (CONTINUED)

LEAD DATA SUMMARY
L.E. CARPENTER AND COMPANY

Sample Number	Lead Concentration (mg/kg)	Feet Below Grade
HA-26	94.8	0.0 - 0.5
HA-27	44.7	0.0 - 0.5
HA-28	258	0.0 - 0.5
Post-Excavation Data - Remedial Action		
HSB-PES-1	1230	0.0 - 0.5
HSB-PES-2	719	0.0 - 0.5
HSB-PEB-1	990	2.0 - 2.5
HSB-PES-10	321	0.0 - 0.5
HSB-PES-11	826	0.0 - 0.5
HSB-PES-12	2130	0.0 - 0.5
HSB-PES-13	540	0.0 - 0.5
HSB-PEB-10	16.1	4.0 - 4.5
HSB-PEB-20	145	4.0 - 4.5
HSB-PES-20	1370	0.0 - 0.5
HSB-PES-21	1740	0.0 - 0.5
HSB-PES-30	1260	0.0 - 0.5
HSB-PES-31	2100	0.0 - 0.5
HSB-PES-32	2060	0.0 - 0.5
HSB-PES-40	1260	0.0 - 0.5
HSB-PES-41	2460	0.0 - 0.5
HSB-PES-42	2110	0.0 - 0.5
HSC-PES-1	860	0.0 - 0.5
HSC-PES-2	824	0.0 - 0.5
HSC-PES-3	644	0.0 - 0.5
HSC-PEB-1	246	2.0 - 2.5
HSC-PES-10	856	0.0 - 0.5

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TABLE 1 (CONTINUED)

LEAD DATA SUMMARY
L.E. CARPENTER AND COMPANY

Sample Number	Lead Concentration (mg/kg)	Feet Below Grade
HSC-PES-11	627	0.0 - 0.5
HSC-PES-12	436	0.0 - 0.5
HSC-PES-13	293	0.0 - 0.5
HSC-PES-14, HSC-PES-15	477, 363	0.0 - 0.5
HSC-PES-20	853	0.0 - 0.5
HSC-PES-21	1200	0.0 - 0.5
HSC-PES-30	611	0.0 - 0.5
HSC-PES-31	1180	0.0 - 0.5
HSD-PES-1, HSD-PES-4	151, 151	0.25 - 0.75
HSD-PES-2	69.9	0.25 - 0.75
HSD-PES-3	338	0.25 - 0.75
HSD-PEB-1	92.6	2.0 - 2.5
WDA-PEB-1	409	3.5 - 4.0
WDA-PEB-2	122	3.5 - 4.0
WDA-PES-1, WDA-PES-8	145, 195	5.5 - 6.0
WDA-PES-2	64.9	3.5 - 4.0
WDA-PEB-3	203	4.5 - 5.0
WDA-PEB-4	842	4.5 - 5.0
WDA-PES-3	574	4.5 - 5.0
WDA-PES-4	33.4	4.5 - 5.0
WDA-PEB-5	57.4	4.0 - 4.5
WDA-PEB-6	237	3.5 - 4.0
WDA-PES-5	187	3.5 - 4.0
WDA-PES-6	1310	3.5 - 4.0

eastern portion of the site. Soil boring, test pit, and hot spot excavation soil profiles presented in previous reports provided to the NJDEP clearly indicate that fill is prevalent to the east of the railroad right-of-way.

Further, after reviewing all of the data and calculating the average and standard deviation of the surface versus deep (>2 ft.) samples (refer to Table 2), WESTON would like to note the following:

TABLE 2

SUMMARY OF LEAD DATA

Sampling Interval	# of Samples	Mean Lead Concentration (mg/kg)	Standard Deviation
Surface (0-2 ft.)	55	749	1055
Deep (>2.0 ft.)	44	198	282

Table 2 indicates the mean lead concentration in the surface interval (0-2 ft.) is 749 mg/kg, while the mean concentration in the deep soils (>2 ft.) is 198 mg/kg. The standard deviation for both of these data sets indicates considerable variability in lead concentrations throughout the site, which would be expected with fill material.

In consideration of the future use restrictions being placed on the property, and the fact that the source of the elevated lead concentration detected on-site was the mine tailings placed as historic

fill, WESTON still requests that NJDEP consider an Explanation of Significant Difference (ESD) for site-wide lead concentrations. To that end and consistent with your request for further delineation of Hot Spots "B" and "C", WESTON has included a proposed delineation plan as Attachment #1 to this correspondence.

Should you have questions regarding this letter or the delineation plan, please call me at (908) 417-5830 at your earliest convenience.

Very Truly Yours

ROY F. WESTON, INC.

Martin J. O'Neill, CIH, CHMM
Project Director

cc: C. Anderson, L.E. Carpenter
J. Predergast, NJDEP
D. Van Voorhis, WESTON
L. Amend-Babcock, WESTON

nk(lf)\Oneill\Bar-1221.Ltr

ROSS STREET

NORTH MAIN STREET

BASELINE

BUILDING 9

BUILDING 8

BUILDING 15

BUILDING 17

BUILDING 16

ROSS and BAKER SILK MILL

BUILDING 14

BUILDING 12

GONE

CONCRETE PAD

LOADING DOCK

SEE FIGURE 2

SEE FIGURE 3

SEE FIGURE 4

SEE FIGURE 5

HEADWALL

DRAINAGE CHANNEL

WALL

WASHINGTON FORGE POND

ROCKAWAY RIVER

RAILROAD RIGHT OF WAY

FLOW

HA-26 (94.8, 0-1.0)

HA-27 (44.7, 0-1.0)

HA-28 (258, 0-1.0)

HA-17 (10.0, 0-0.5)

HA-16 (3.9, 0-0.5)

HA-18 (4.1, 0-0.5)

HA-19 (14.4, 0-0.5)

HA-6 (276, 0-0.5)

HA-7 (108, 0-0.5)

HA-8 (85.5, 0-0.5)

HA-3 (215, 0-0.5)

TP-63 (21.6, 7.5-8.0)

TP-66 (2.6, 7.5-8.0)

TP-65 (8.6, 8.5-9.0)

TP-64 (8.7, 8.5-9.0)

TP-52 (17.5, 4.0-4.5)

TP-53 (39.9, 2.5-3.0)

TP-54 (146, 2.0-2.5)

TP-50 (166, 0-0.5) (124, 3.0-3.5)

TP-51 (85, 0-0.5) (77.8, 3.5-4)

TP-75 (7.2, 7.5-8.0)

TP-68 (36.8, 7.5-8.0)

TP-46 (36.4, 5.5-6.0)

TP-71 (229, 5.0-5.5)

TP-70 (97.2, 7.5-8.0)

TP-73 (9.5, 7.5-8.0)

TP-72 (203, 6.0-6.5)

TP-69 (204, 5.5-6.0)

TP-74 (154, 6.5-7.0)

TP-4 (25.7, 0-0.5) (75.2, 4.5-5.0)

TP-67 (124, 3.0-3.5)

TP-5 (19.5, 0-0.5) (765, 4.0-4.5)

TP-3 (31.2, 0-0.5) (12.1, 4.5-5.0)

TP-2 (63.4, 0-0.5) (79.6, 1.7)

TP-6 (14.7, 0-0.5) (21.7, 3.5-4)

TP-7 (12.7, 0-0.5) (30.3, 4.5-5.0)

TP-8 (31.5, 0-0.5) (166, 2.5-3.0)

TP-9 (6530, 0-0.5) (338, 2.0-2.5)

LEGEND

- PROPERTY LINE
- EDGE OF RIVER
- FENCE LINE
- HA-3 — HAND AUGER SAMPLE LOCATION
- TP-75 — TEST PIT LOCATION
- (215, 0-0.5) — CONCENTRATION LEAD (MG/KG), DEPTH BELOW GRADE OF SAMPLE

GRAPHIC SCALE

60 0 30 60

1 inch = 30 ft.

BOUNDARY & FILE NAME: LED-SOIL.DWG DATE: 10/24/95 Drawn BY: B. MAC

WESTON MANAGERS DESIGNERS/CONSULTANTS

PROJECT NAME: LEAD IN SOIL DATA COMPILATION

WHARTON, NEW JERSEY

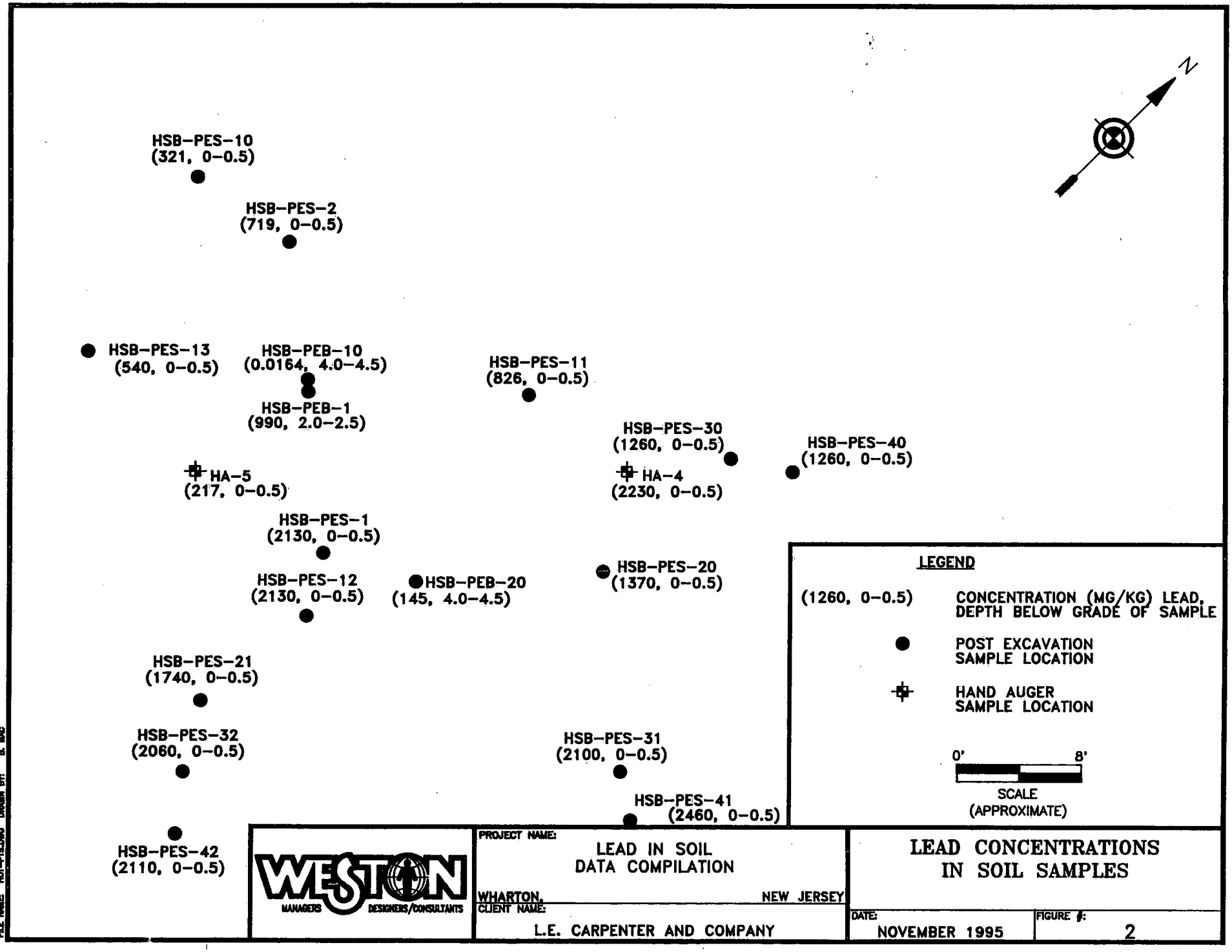
CLIENT NAME: L.E. CARPENTER AND COMPANY

WORK ORDER No. 06720-020-002-0009-00 CLIENT No.

DELIVERY ORDER No. DATE: OCTOBER 1995

LEAD CONCENTRATIONS IN SOIL SAMPLES

REVISION No. FIGURE #: 1



REVISION #: 1 DATE: 11/14/95
FILE NAME: HOT-PYBLDWG DRAWN BY: B. MAC

WESTON MANAGERS DESIGNERS/CONSULTANTS

PROJECT NAME:
LEAD IN SOIL
DATA COMPILATION

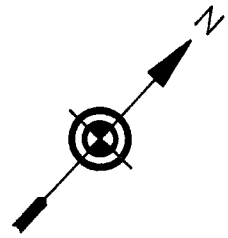
WHARTON, NEW JERSEY

CLIENT NAME:
L.E. CARPENTER AND COMPANY

LEAD CONCENTRATIONS IN SOIL SAMPLES

DATE: NOVEMBER 1995

FIGURE #: 2



HSC-PES-31
(1180, 0-0.5)

HSC-PES-21
(1200, 0-0.5)

HSC-PES-30
(611, 0-0.5)

HSC-PES-20
(853, 0-0.5)

HSC-PES-11
(627, 0-0.5)

HSC-PES-10
(856, 0-0.5)

HSC-PES-1
(860, 0.25-0.75)

HA-2
(693, 0-0.5)

HSC-PES-2
(824, 0.5-1.0)

HSC-PEB-1
(248, 2.0-2.5)

HSC-PES-14, (477, 0-0.5)
HSC-PES-15 (383, 0-0.5)

HSC-PES-12
(436, 0-0.5)

HSC-PES-3
(644, 0.25-0.75)

HSC-PES-13
(293, 0-0.5)

LEGEND

(436, 0-0.5)	CONCENTRATION (MG/KG) LEAD, DEPTH BELOW GRADE OF SAMPLE
●	POST EXCAVATION SAMPLE LOCATION
⌖	HAND AUGER SAMPLE LOCATION

WESTON MANAGERS DESIGNERS/CONSULTANTS

PROJECT NAME: LEAD IN SOIL DATA COMPILATION

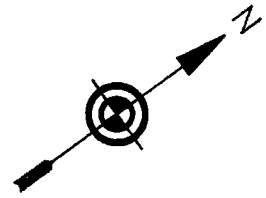
WHARTON, NEW JERSEY

CLIENT NAME: L.E. CARPENTER AND COMPANY

LEAD CONCENTRATIONS IN SOIL SAMPLES

DATE: NOVEMBER 1995

FIGURE #: 3



HSD-PES-1, HSD-PES-4
(151, 0.25-0.75), (151, 0.25-0.75)

HSD-PEB-1
(92.6, 2.0-2.5)

TP-9
(6530, 0-0.5)
(338, 2.0-2.5)

HSD-PES-2
(69.9, 0.25-0.75)

MW-9

HSD-PES-3
(338, 0.25-0.75)

LEGEND

● POST EXCAVATION SAMPLING LOCATION

+ TEST PIT SAMPLING LOCATION

(19.5, 0-0.5) CONCENTRATION (MG/KG) LEAD, DEPTH BELOW GRADE OF SAMPLE

0' 4'
SCALE
(APPROXIMATE)

WESTON MANAGERS DESIGNERS/CONSULTANTS

PROJECT NAME:
LEAD IN SOIL
DATA COMPILATION

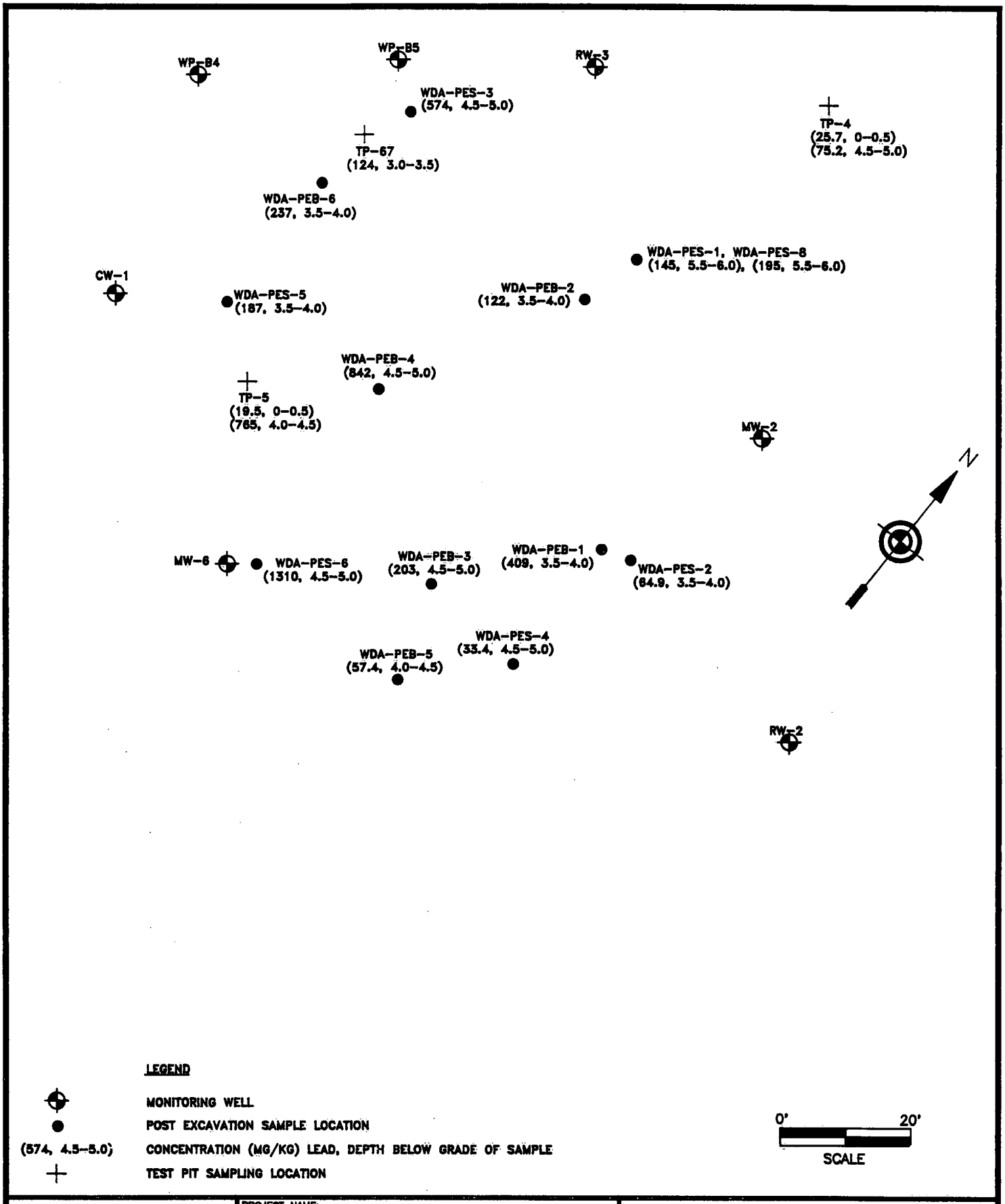
WHARTON, NEW JERSEY

CLIENT NAME:
L.E. CARPENTER AND COMPANY

LEAD CONCENTRATIONS
IN SOIL SAMPLES

DATE:
NOVEMBER 1995

FIGURE #:
4



WESTON MANAGERS DESIGNERS/CONSULTANTS	PROJECT NAME: LEAD IN SOIL DATA COMPILATION WHARTON, NEW JERSEY CLIENT NAME: L.E. CARPENTER AND COMPANY	LEAD CONCENTRATIONS IN SOIL SAMPLES DATE: NOVEMBER 1995 FIGURE #: 5

WESTON
MANAGERS DESIGNERS CONSULTANTS

ATTACHMENT #1

CONTAMINANT DELINEATION PLAN - HOT SPOTS B AND C
L.E. CARPENTER & COMPANY, WHARTON, NEW JERSEY

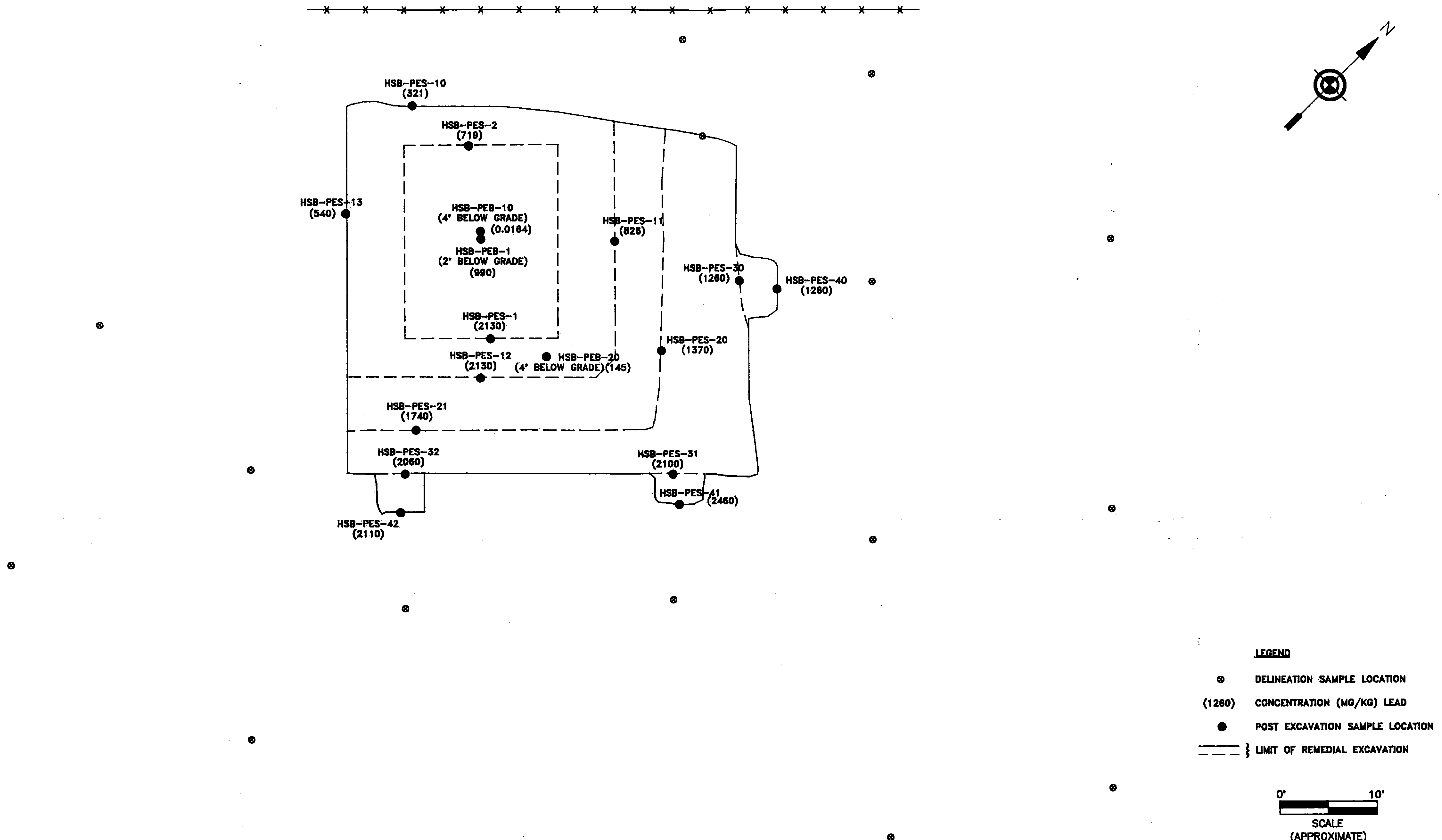
On behalf of L.E. Carpenter and Company, Roy F. Weston, Inc .(WESTON®) proposes to perform 17 soil boring in association with Hot Spot B. The locations of the proposed samples are presented in Figure 1. WESTON also proposed to perform 14 soil borings in association with Hot Spot C at the locations depicted on Figure 2. The method(s) used to perform the soil borings will be appropriate for the subsurface conditions encountered.

Each soil boring will be sampled at three distinct depths: 0.0 to 0.5 feet below grade, 2.0 to 2.5 feet below grade, and 4.0 to 4.5 feet below grade. All soil samples will be submitted to an NJDEP-Certified laboratory. Analysis for the soil samples will be limited to lead.

Analysis of the samples sent to the laboratory will be phased; initial analysis will be performed on the delineation samples located closest to post-excavation samples that did not comply with the cleanup criterion. If necessary, additional samples will be analyzed to determine the lateral and horizontal extent of lead in excess of 600 mg/kg.

Field procedures will be consistent with the *Technical Requirements for Site Remediation* (N.J.A.C. 7:26E) and the *field Sampling Procedures Manual* (NJDEP, May 1992). Blind field duplicates will be collected at a frequency of one duplicate for every 20 samples. Consistent with the requirements of the *Field Sampling Procedures Manual*, rinsate blanks will not be collected, since the soil samples will not be analyzed for volatile organic compounds. Matrix spike/matrix spike duplicate samples will be performed at the frequency required by the analytical method used.

The sampling frequencies presented in Figures 1 and 2 are consistent with the frequencies required for post-excavation sample collection specified in the *Technical Requirements for Site Remediation.* Therefore, WESTON proposes using the delineation samples to meet the requirements of post-excavation samples, if additional excavation is required.



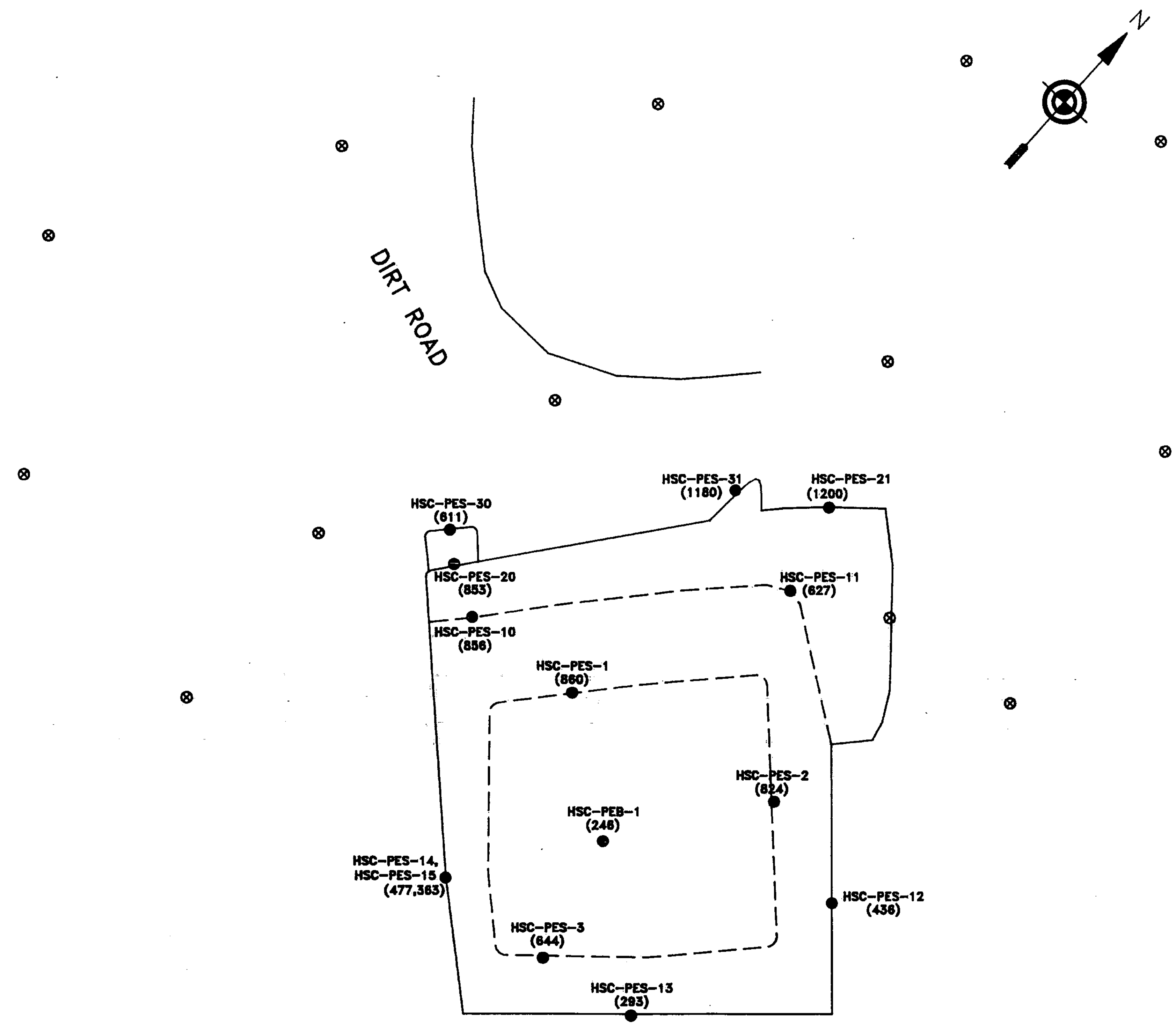
WESTON
MANAGERS DESIGNERS/CONSULTANTS

PROJECT NAME:
PHASE I
REMEDIAL ACTION
WHARTON, NEW JERSEY
CLIENT NAME:
L.E. CARPENTER AND COMPANY

LIMIT OF EXCAVATION
HOT SPOT B

DATE: 12/15/95
FIGURE #: 1

WO # 05720-020-002-0009 DATE 12/15/95
FILE NAME HS-B.DWG DRAWN BY B. MAC



0' 12'
SCALE
(APPROXIMATE)

LEGEND

LIMIT OF REMEDIAL ACTION EXCAVATION

⊗ DELINEATION SAMPLE LOCATION

● POST EXCAVATION SAMPLE LOCATION

(1180) CONCENTRATION (MG/KG) LEAD

WESTON MANAGERS DESIGNERS/CONSULTANTS

PROJECT NAME: PHASE I REMEDIAL ACTION

WHARTON, NEW JERSEY

CLIENT NAME: L.E. CARPENTER AND COMPANY

PROPOSED DELINEATION SAMPLE LOCATIONS HOT SPOT C

DATE: 12/15/95

FIGURE #: 2